# COULD E-LEARNING CHANGE HOW WE THINK ABOUT SCHOLARSHIP AND TEACHING?


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Session 2B @ 11:30

# WHAT IS E-LEARNING?

E-Learning is learning through electronic means, some examples are:

**Online Educational Games**

**Online Simulations**

**Online Tutorials**

# BACKGROUND & AIMS OF THE PROJECT?

**E-Learning Strategy** → **School of Chemistry work** → **Learning Science Ltd** → **Pre-Lab and Post-Lab resources**

To investigate how the **student learning experience** can be enhanced with **E-learning resources** in the Organic Chemistry Labs at the University of Glasgow.

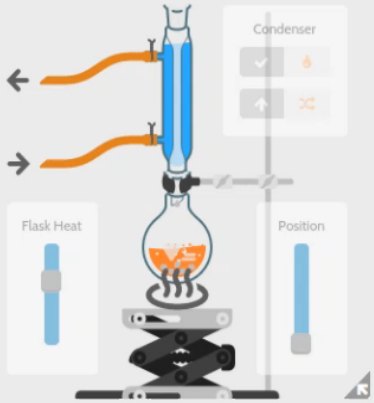
# EXAMPLE OF **PRE-LAB SIMULATIONS**

## Reflux

In this exercise, you can practise setting up and performing a reflux experiment.

You will need to set up the apparatus safely and securely and use the appropriate level of heating so that your reaction mixture boils gently and the vapour condenses back into the reaction vessel.

By working through the exercise, you will become familiar with the equipment and how it should be used. This is your opportunity to explore different options and to understand the consequences of your choices. At any stage, you can get specific feedback about one element that requires attention and an indication of how many others need changing.






Start

VIA VERITAS VITA

# EXAMPLE OF **POST-LAB ONLINE REPORT**

## EXPERIMENT 7 - TLC IN SEPARATION OF BENZOIC ACID FROM BENZIL

### INSTRUCTIONS

1. Use the Activity to analyse your data. You may copy and paste in values from your spreadsheet programme.
2. This Activity is designed to be used in concert with your lab manual; **you should consult that manual first if you are unsure how to proceed with the analysis.**
3. On typing a value into a cell, feedback will be provided in real time to help minimise transcription errors.
4. You have to submit your answers for grading either by pressing [Enter] or [Return].
5. Some cells are initially locked. This is because they rely on values from other cells, and they will become available when the preceding cells have been successfully answered.
6. Once a cell has been successfully completed, it becomes locked and can no longer be edited. **Double check that you are certain of your raw data values before submitting them.**

### DATA AND ANALYSIS

SCORE: 0% SAVED: ✔ Zoom Dark

# METHODS OF RESEARCH

**Before the practical laboratory**

Relating to the pre lab resources:

5. The pre lab provided me with good opportunities to practice *

*Mark only one oval.*

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| St | | | | | | Strongly agree |

6. I f

*Mark only one oval.*

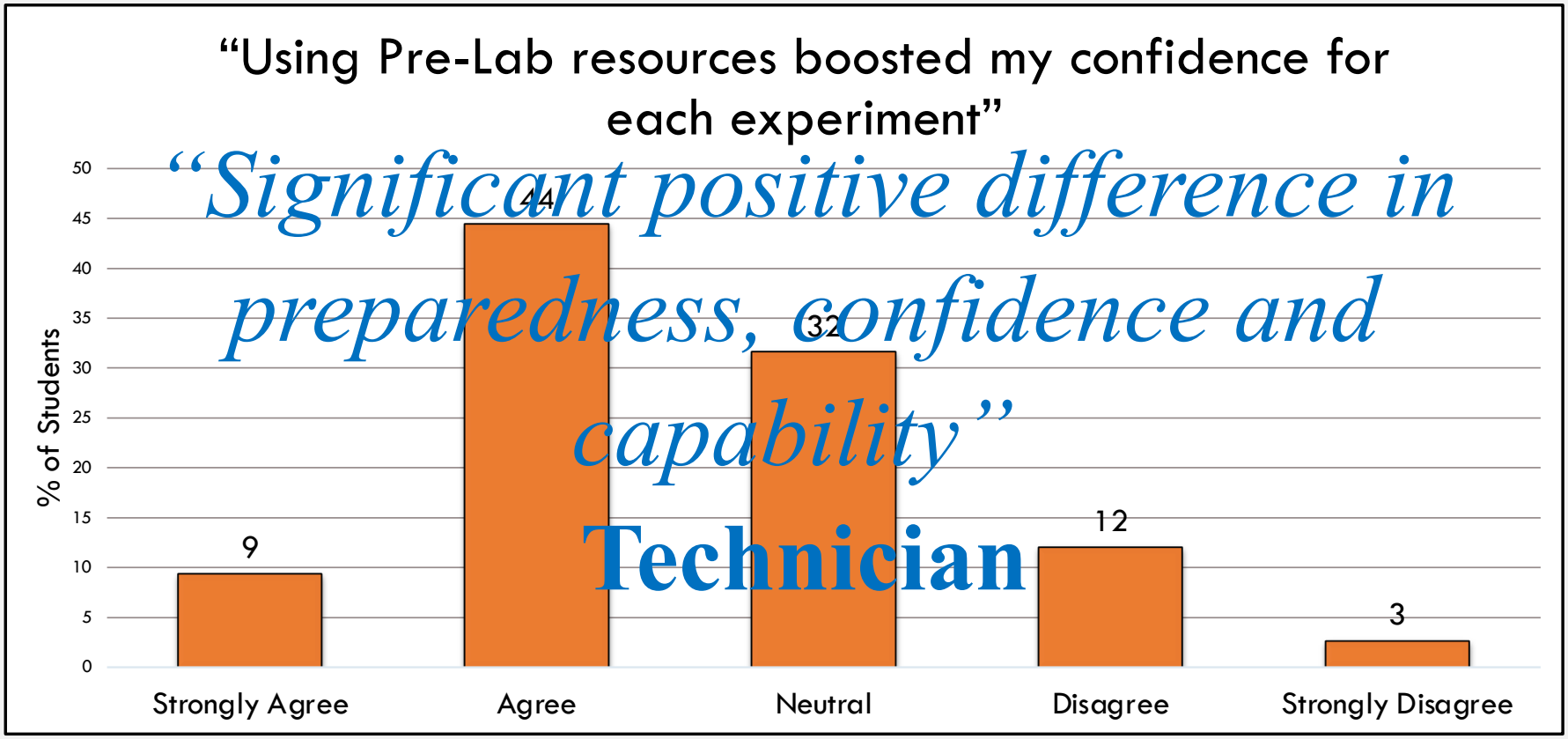
| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Strongly disagree | | | | | | Strongly agree |

**Focus Groups**

**Online Questionnaires**

VIA VERITAS VITA

# PRE-LAB RESULTS (1ST YEAR)

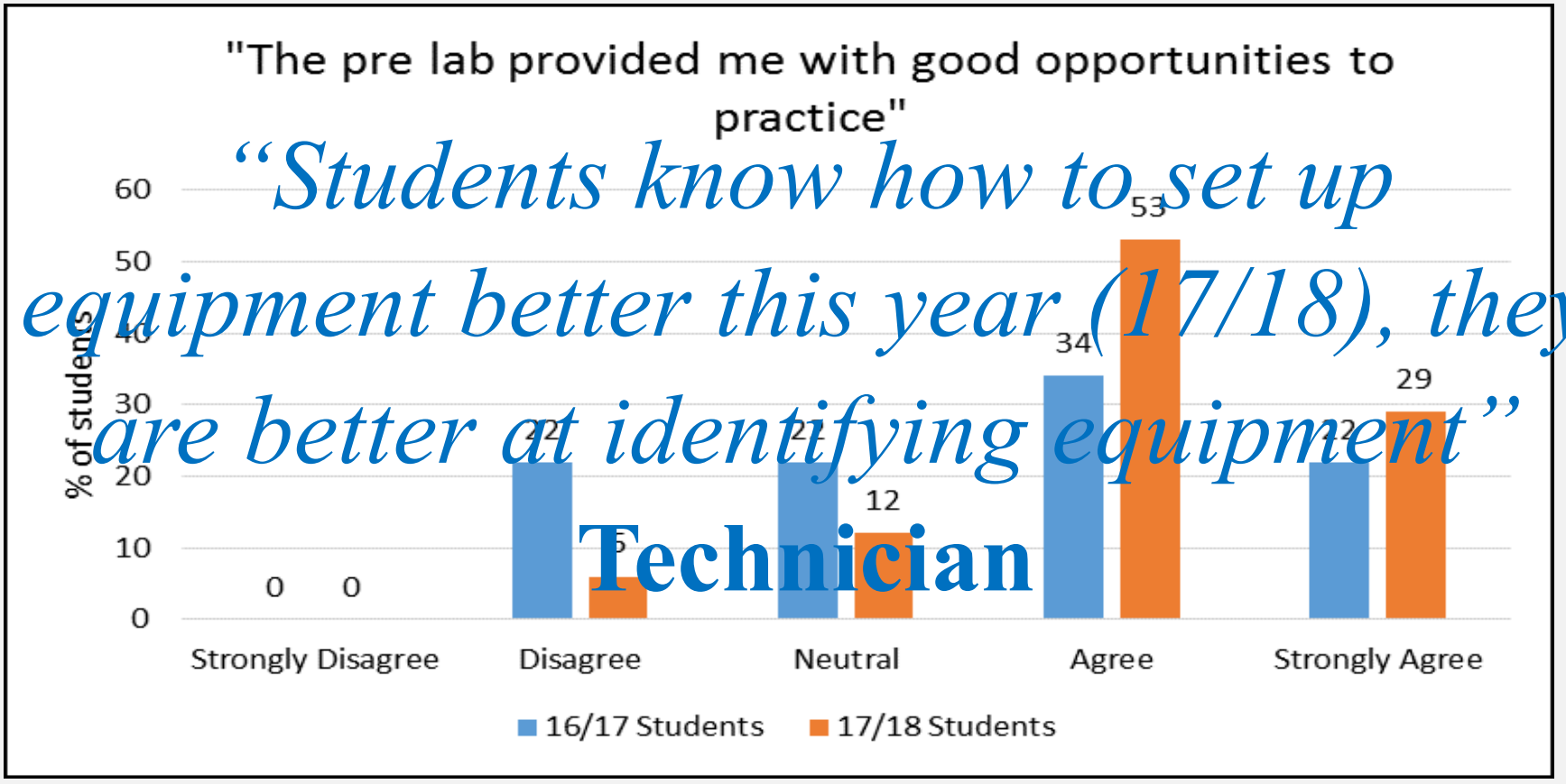



*"Significant positive difference in preparedness, confidence and capability"*

**Technician**

VIA VERITAS VITA

# PRE-LAB RESULTS (3RD YEAR)

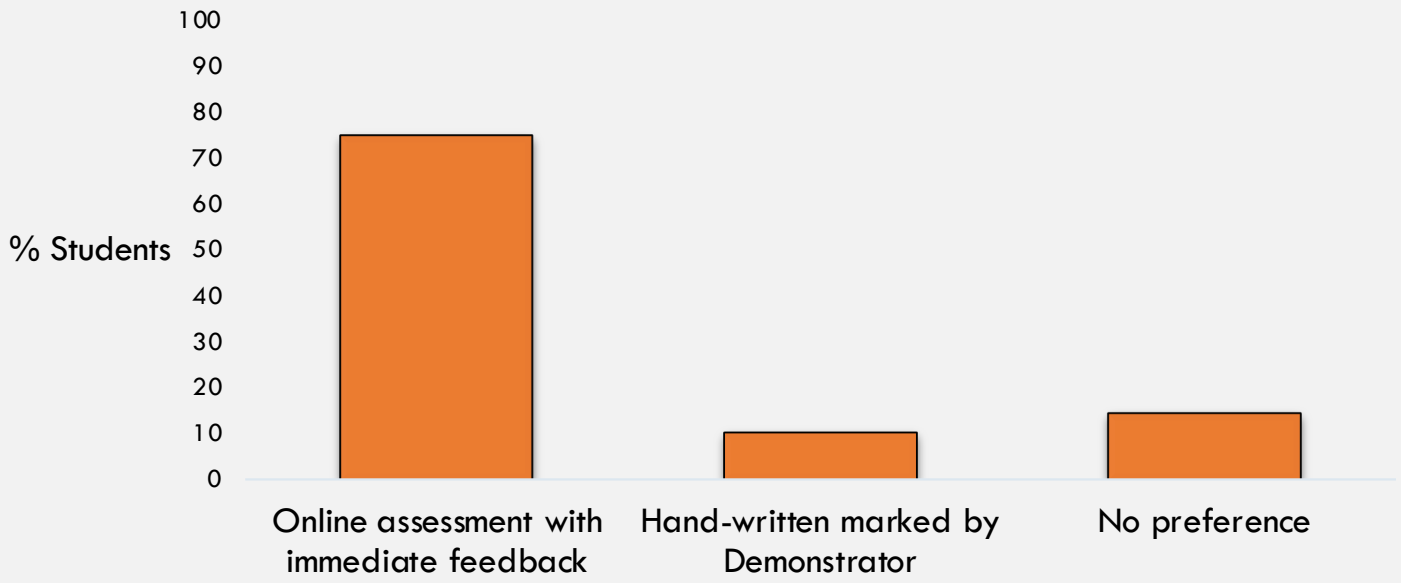



*"Students know how to set up equipment better this year (17/18), they are better at identifying equipment"*

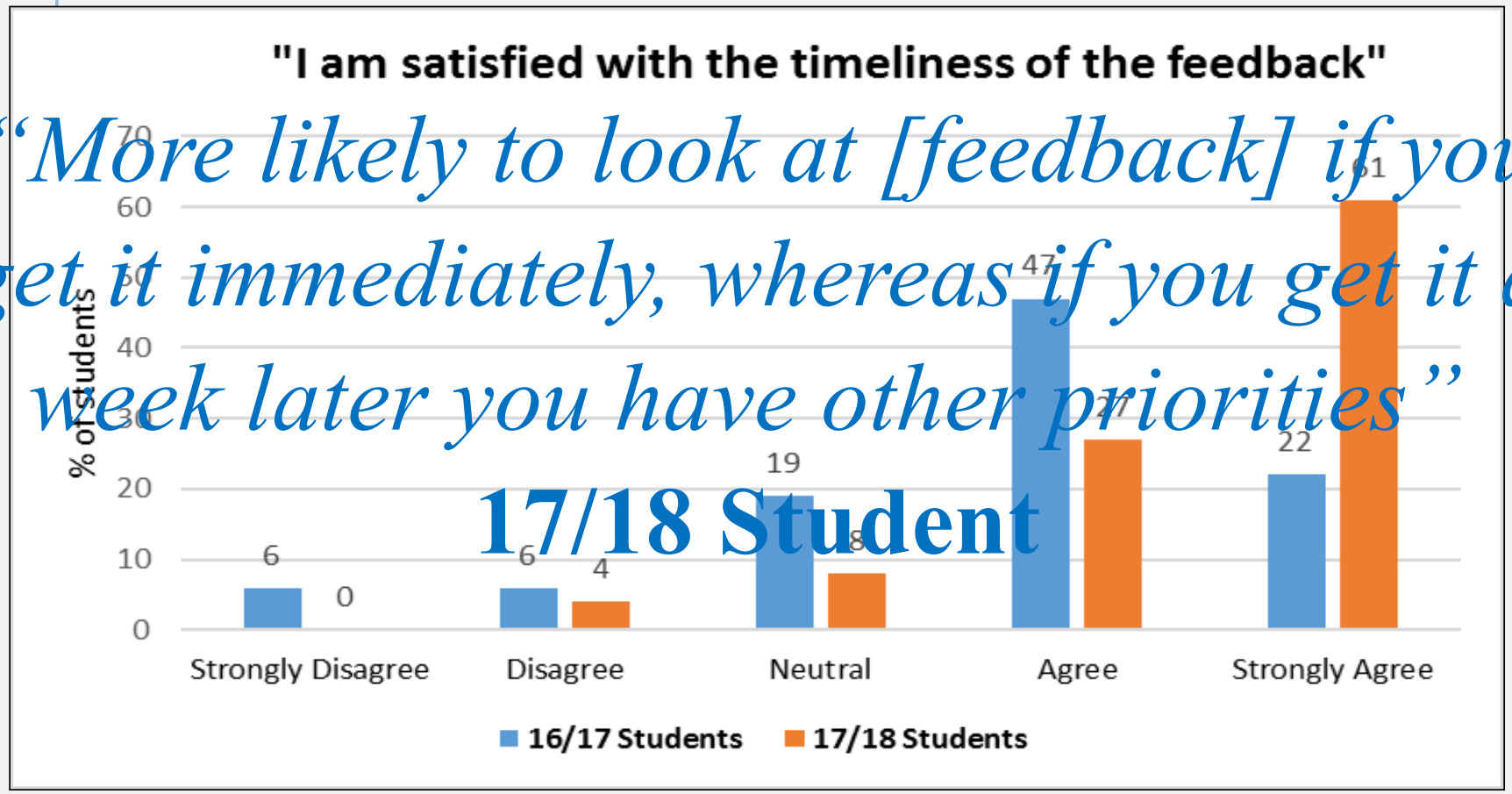
**Technician**

# POST-LAB RESULTS (1ST YEAR)

"I would prefer for my experiments to be marked"




# POST-LAB RESULTS (3RD YEAR)




*"More likely to look at [feedback] if you get it immediately, whereas if you get it a week later you have other priorities"*

**17/18 Student**

# CONCLUSIONS

- Both studies showed similar results
- **Pre-lab simulations:**

**More prepared**

**Improved Engagement**

**Improved Confidence**

- **Post-lab online reports:**

**Improved Understanding**

**Improved Quality of Feedback**

**Improved Consistency of Assessment**

# IMPACT & WIDER IMPLICATIONS

E-Learning resources shown to **improve student learning experience**

- E-learning resources being introduced in **other Chemistry labs** and could be explored across **University disciplines**

- With rising student numbers:
  - Allow personalised, detailed, instant feedback
  - Rapid, consistent assessment
  - Increased student satisfaction

# ANY QUESTIONS?

# REFERENCES


1) *The Impact of E-learning on Chemistry Education* (2015). *T*he Sixth International Conference on e-Learning (eLearning-2015). Available at: http://econference.metropolitan.ac.rs/files/pdf/2015/17-Tatjana-Andjelkovic-Darko-Andjelkovic-Zoran-Nikolic-The-Impact-of-eLearning-in-Chemistry-Education.pdf

2) Bates, T. and Poole, G. (2003). *Effective teaching with technology in higher education.* San Francisco: Jossey-Bass, pp.5-6.

3) Dr Ciorsdaidh Watts, E-resource developer, School of Chemistry, University of Glasgow.

4) Synthesis 1 Lab impact studies by **Catherine Anne McKenna** and **Jason Erikson** (School of Chemistry Final Year students).

5) Organic 3 Lab impact studies by **Jack Bullon** (School of Chemistry Final Year students)

6) Learning Science Ltd., external E-learning partner, experts in online science learning resources.


# ACKNOWLEDGEMENTS


This work is **co-created and co-supervised** by:

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